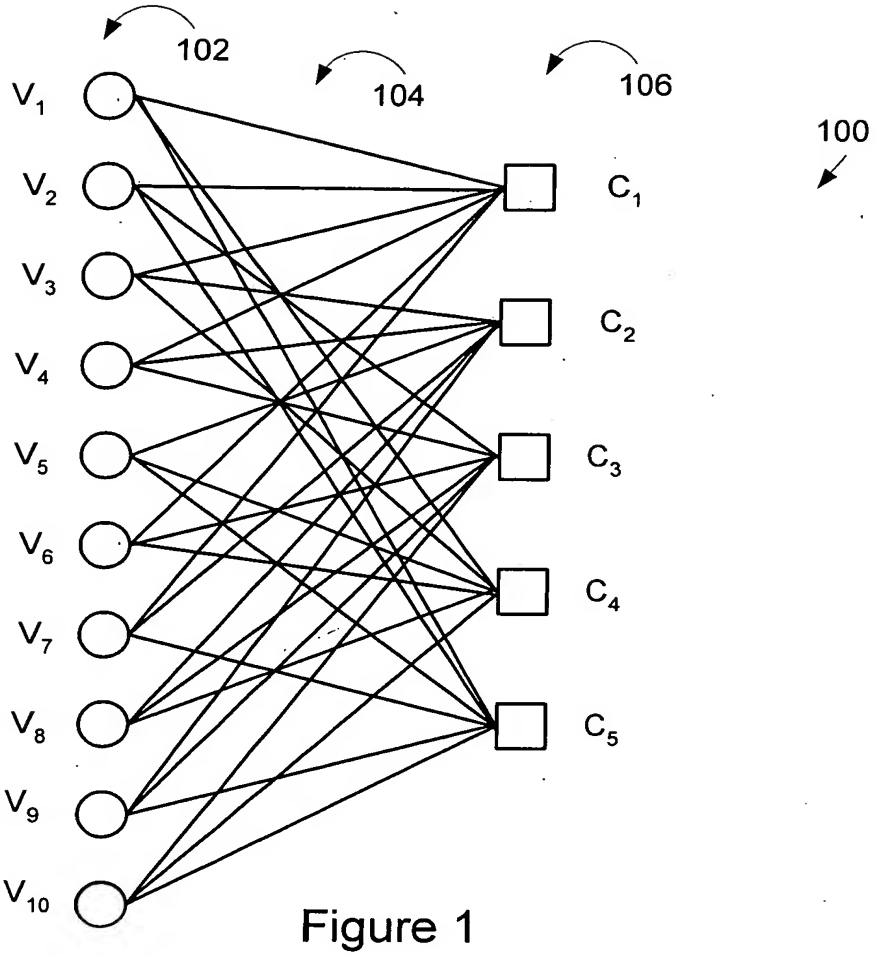


Figure 1

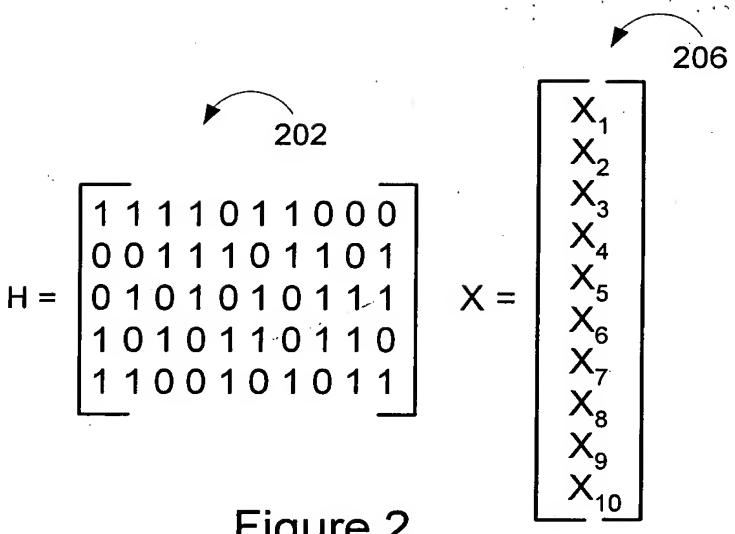

206
202
H =
1 1 1 1 0 1 1 0 0 0
0 0 1 1 1 0 1 1 0 1
0 1 0 1 0 1 0 1 1 1
1 0 1 0 1 1 0 1 1 0
1 1 0 0 1 0 1 0 1 1
X =
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10

Figure 2

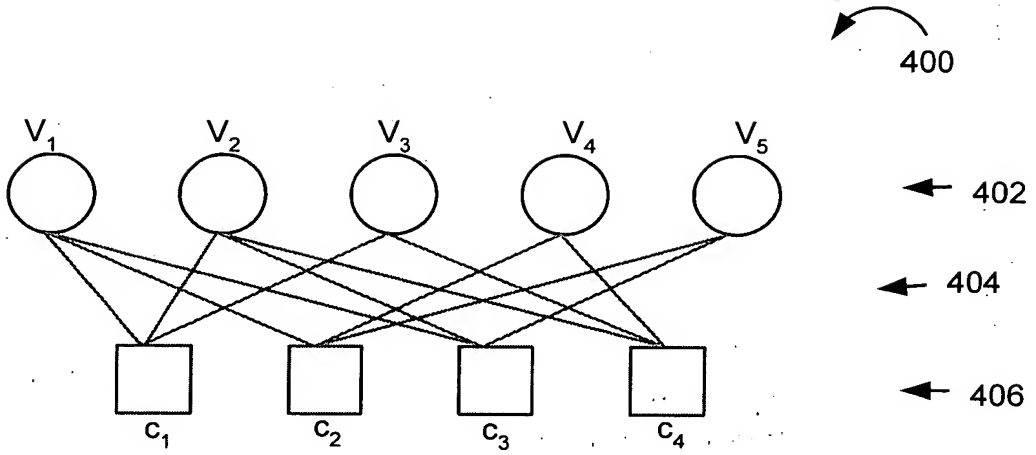


Figure 3

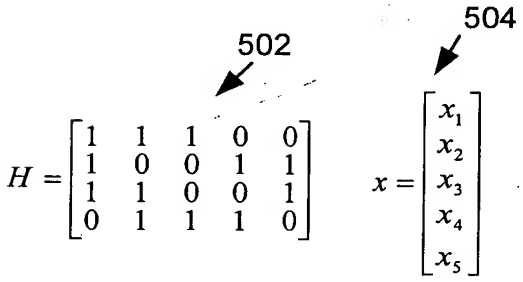


Figure 4

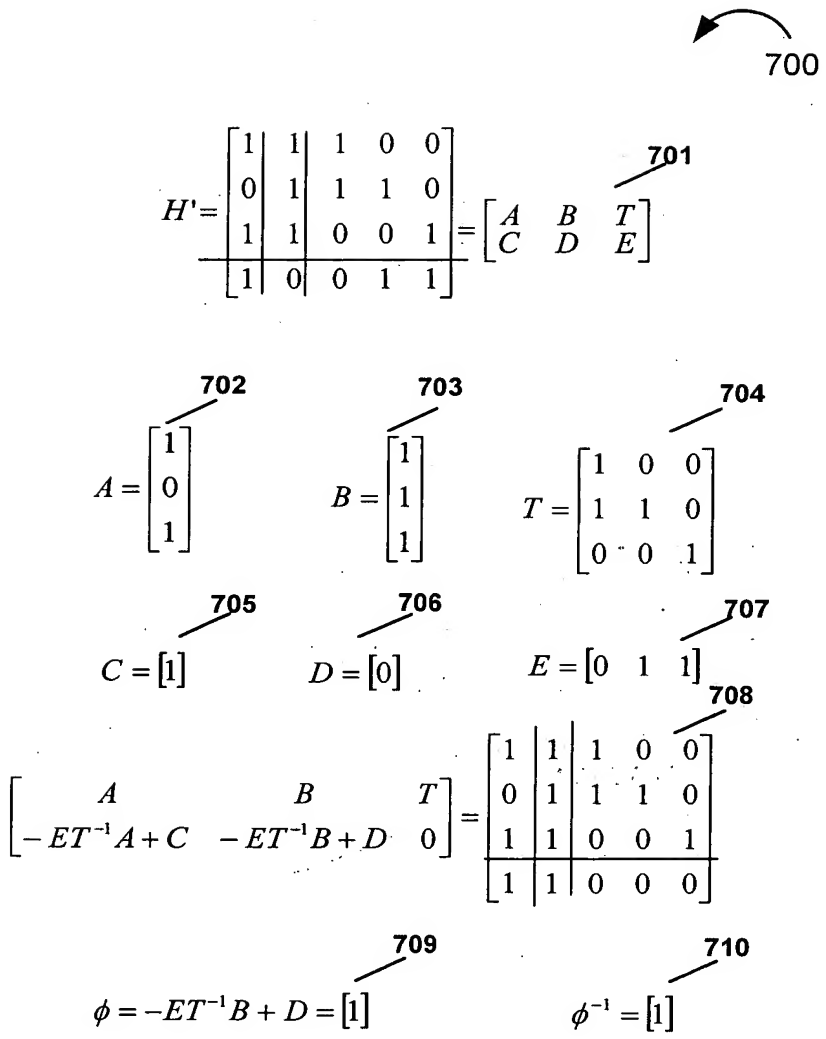

700
701
$H' = \left[\begin{array}{ccc|cc} 1 & 1 & 1 & 0 & 0 \\ 0 & 1 & 1 & 1 & 0 \\ 1 & 1 & 0 & 0 & 1 \\ \hline 1 & 0 & 0 & 1 & 1 \end{array}\right] = \begin{bmatrix} A & B & T \\ C & D & E \end{bmatrix}$
702
$A = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$
703
$B = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$
704
$T = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$
705
$C = [1]$
706
$D = [0]$
707
$E = [0 \quad 1 \quad 1]$
708
$\begin{bmatrix} A & B & T \\ -ET^{-1}A + C & -ET^{-1}B + D & 0 \end{bmatrix} = \left[\begin{array}{ccc|cc} 1 & 1 & 1 & 0 & 0 \\ 0 & 1 & 1 & 1 & 0 \\ 1 & 1 & 0 & 0 & 1 \\ \hline 1 & 1 & 0 & 0 & 0 \end{array}\right]$
709
$\phi = -ET^{-1}B + D = [1]$
710
$\phi^{-1} = [1]$

Figure 5

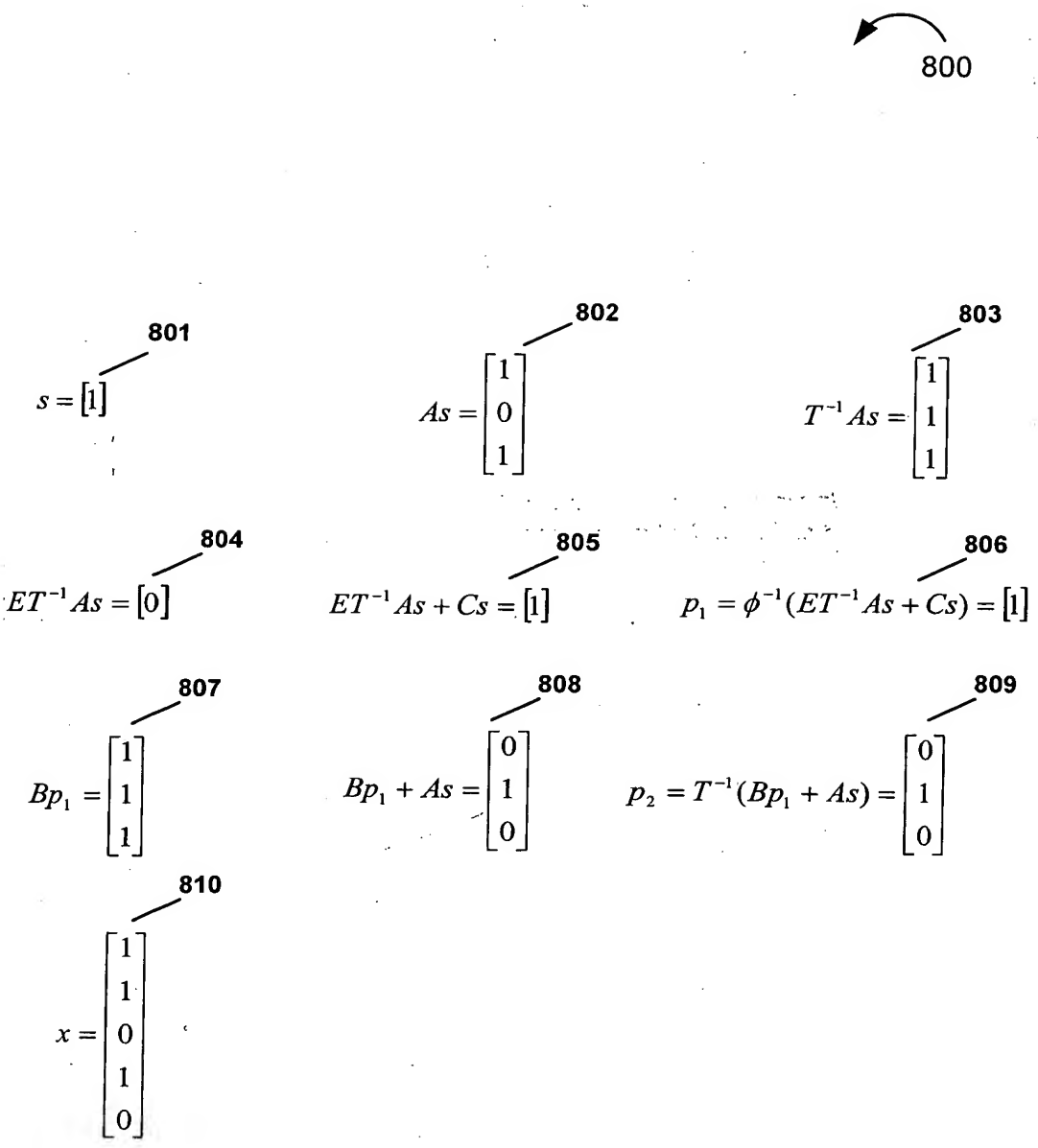
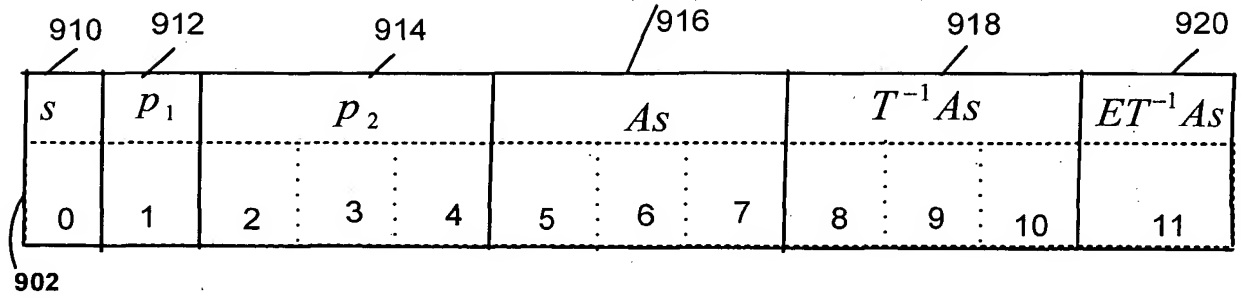

800
801
$s = [1]$
802
$As = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$
803
$T^{-1}As = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$
804
$ET^{-1}As = [0]$
805
$ET^{-1}As + Cs = [1]$
806
$p_1 = \phi^{-1}(ET^{-1}As + Cs) = [1]$
807
$Bp_1 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$
808
$Bp_1 + As = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$
809
$p_2 = T^{-1}(Bp_1 + As) = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$
810
$x = \begin{bmatrix} 1 \\ 1 \\ 0 \\ 1 \\ 0 \end{bmatrix}$

Figure 6



	op	a	b
As	0	5	0
	0	7	0
$T^{-1}As$	0	8	5
	0	9	6
	1	9	8
	1	10	7
$ET^{-1}As$	0	11	9
	1	11	10
$Cs+ET^{-1}As$	1	11	0
$\phi^{-1}(Cs+ET^{-1}As)$	0	1	11
Bp_1+As	1	5	1
	1	6	1
	1	7	1
$T^{-1}(Bp_1+As)$	0	2	5
	0	3	6
	1	3	2
	1	4	7

904

0	1	2	3	4	5	6	7	8	9	10	11
1	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	1	0	0	0	0	0	0
1	0	0	0	0	1	0	1	0	0	0	0
1	0	0	0	0	1	0	1	1	0	0	0
1	0	0	0	0	1	0	1	1	0	0	0
1	0	0	0	0	1	0	1	1	1	0	0
1	0	0	0	0	1	0	1	1	1	1	0
1	0	0	0	0	1	0	1	1	1	1	1
1	0	0	0	0	1	0	1	1	1	1	0
1	0	0	0	0	1	0	1	1	1	1	1
1	1	0	0	0	1	0	1	1	1	1	1
1	1	0	0	0	0	0	1	1	1	1	1
1	1	0	0	0	0	1	1	1	1	1	1
1	1	0	0	0	0	1	0	1	1	1	1
1	1	0	0	0	0	1	0	1	1	1	1
1	1	0	1	0	0	1	0	1	1	1	1
1	1	0	1	0	0	1	0	1	1	1	1
1	1	0	1	0	0	1	0	1	1	1	1

906

Figure 7

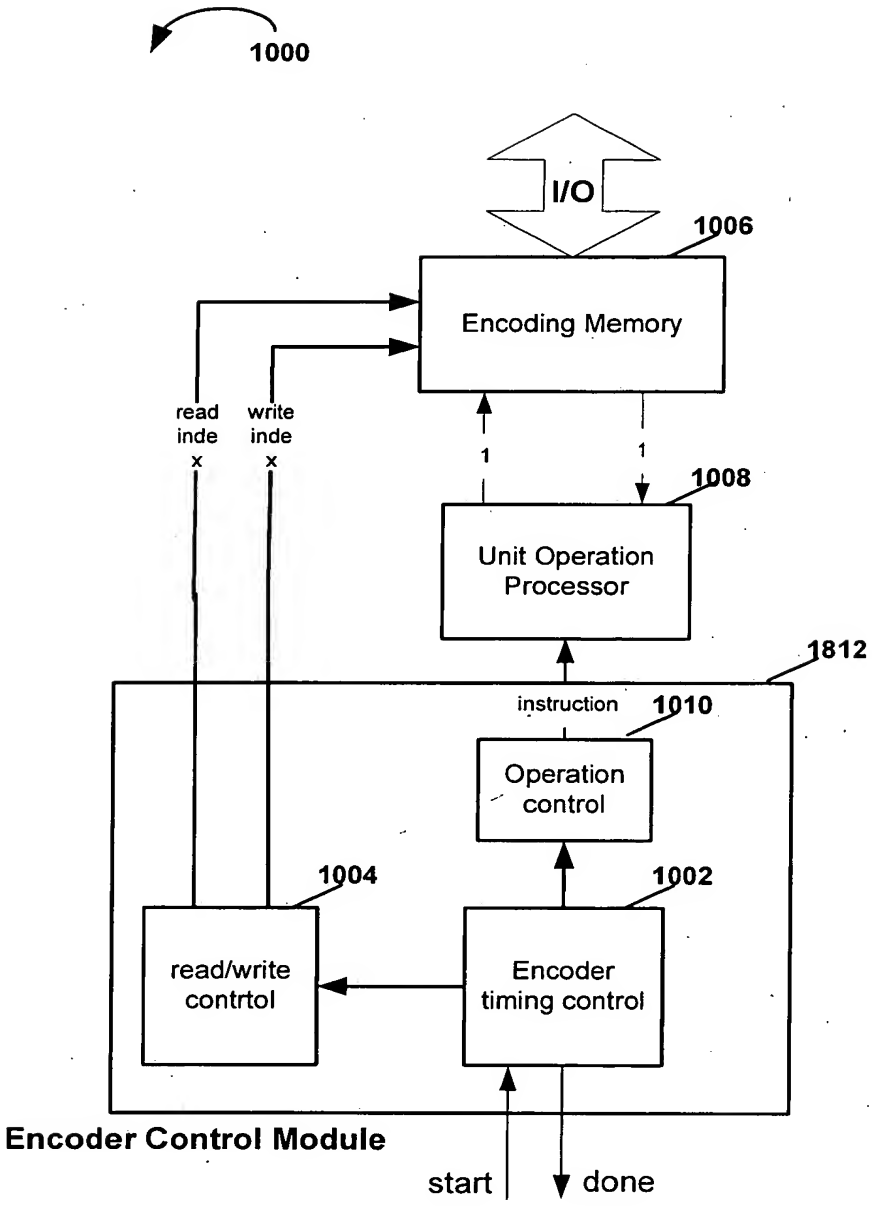

1000
I/O
1006
Encoding Memory
read inde x
write inde x
1
1
1008
Unit Operation Processor
1812
instruction
1010
Operation control
1004
1002
read/write contrtol
Encoder timing control
Encoder Control Module
start
done

Figure 8

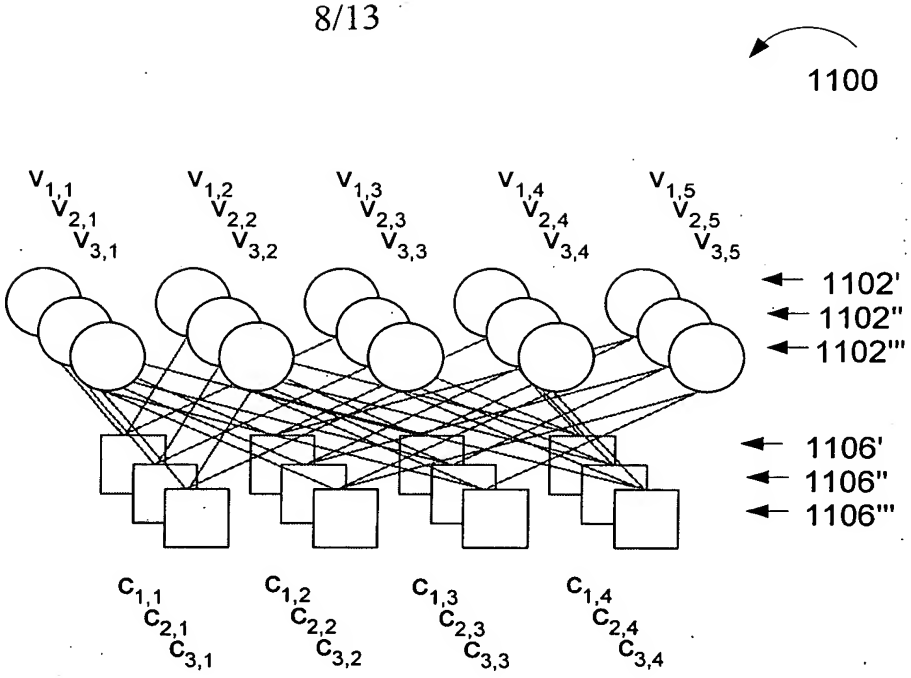


Figure 9

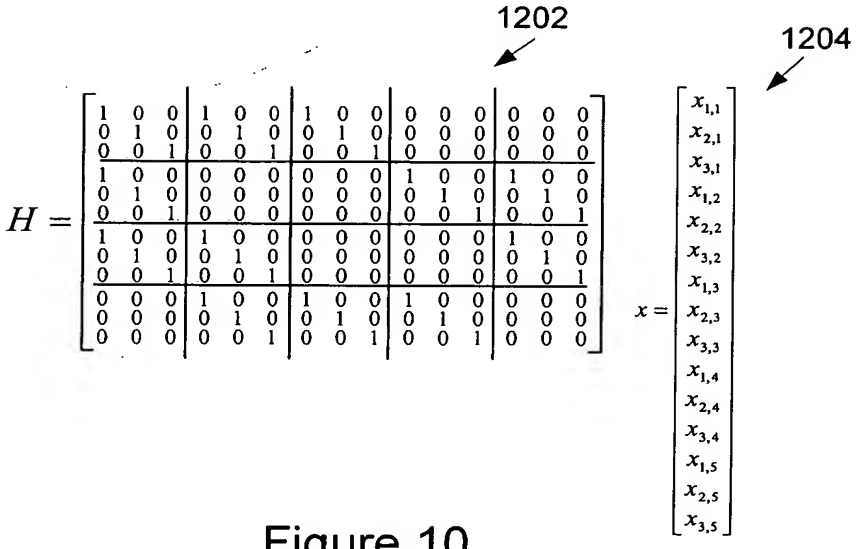


Figure 10

1302

$$H = \left[\begin{array}{ccc|ccc|ccc|ccc|ccc} 0&1&0&0&1&0&0&0&1&0&0&0&0&0&0 \\ 0&0&1&0&0&1&1&0&0&0&0&0&0&0&0 \\ 1&0&0&1&0&0&0&1&0&0&0&0&0&0&0 \\ \hline 0&0&1&0&0&0&0&0&0&1&0&0&1&0&0 \\ 1&0&0&0&0&0&0&0&0&0&1&0&0&1&0 \\ 0&1&0&0&0&0&0&0&0&0&0&1&0&0&1 \\ \hline 1&0&0&0&0&1&0&0&0&0&0&0&0&1&0 \\ 0&1&0&1&0&0&0&0&0&0&0&0&0&0&1 \\ 0&0&1&0&1&0&0&0&0&0&0&0&1&0&0 \\ \hline 0&0&0&1&0&0&0&1&0&0&0&1&0&0&0 \\ 0&0&0&0&1&0&0&0&1&1&0&0&0&0&0 \\ 0&0&0&0&0&1&1&0&0&0&1&0&0&0&0 \end{array}\right] = \left[\begin{array}{ccccc} \sigma^1 & \sigma^1 & \sigma^2 & 0 & 0 \\ \sigma^2 & 0 & 0 & \sigma^0 & \sigma^0 \\ \sigma^0 & \sigma^1 & 0 & 0 & \sigma^2 \\ 0 & \sigma^0 & \sigma^1 & \sigma^2 & 0 \end{array}\right]$$

Figure 11

	$x_{,1}$			$x_{,2}$			$x_{,3}$		$x_{,4}$		$x_{,5}$		
$x_{1,}$	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	1,10	1,11	1,12	← 1402'
$x_{2,}$	2,1	2,2	2,3	2,4	2,5	2,6	2,7	2,8	2,9	2,10	2,11	2,12	← 1402"
$x_{3,}$	3,1	3,2	3,3	3,4	3,5	3,6	3,7	3,8	3,9	3,10	3,11	3,12	← 1402'''

	$c_{,1}$			$c_{,2}$			$c_{,3}$			$c_{,4}$			
$c_{1,}$	2,1	2,4	3,7	3,2	1,9	1,11	1,3	3,5	2,12	1,6	2,8	3,10	← 1404'
$c_{2,}$	3,1	3,4	1,7	1,2	2,9	2,11	2,3	1,5	3,12	2,6	3,8	1,10	← 1404"
$c_{3,}$	1,1	1,4	2,7	2,2	3,9	3,11	3,3	2,5	1,12	3,6	1,8	2,10	← 1404'''

Figure 12

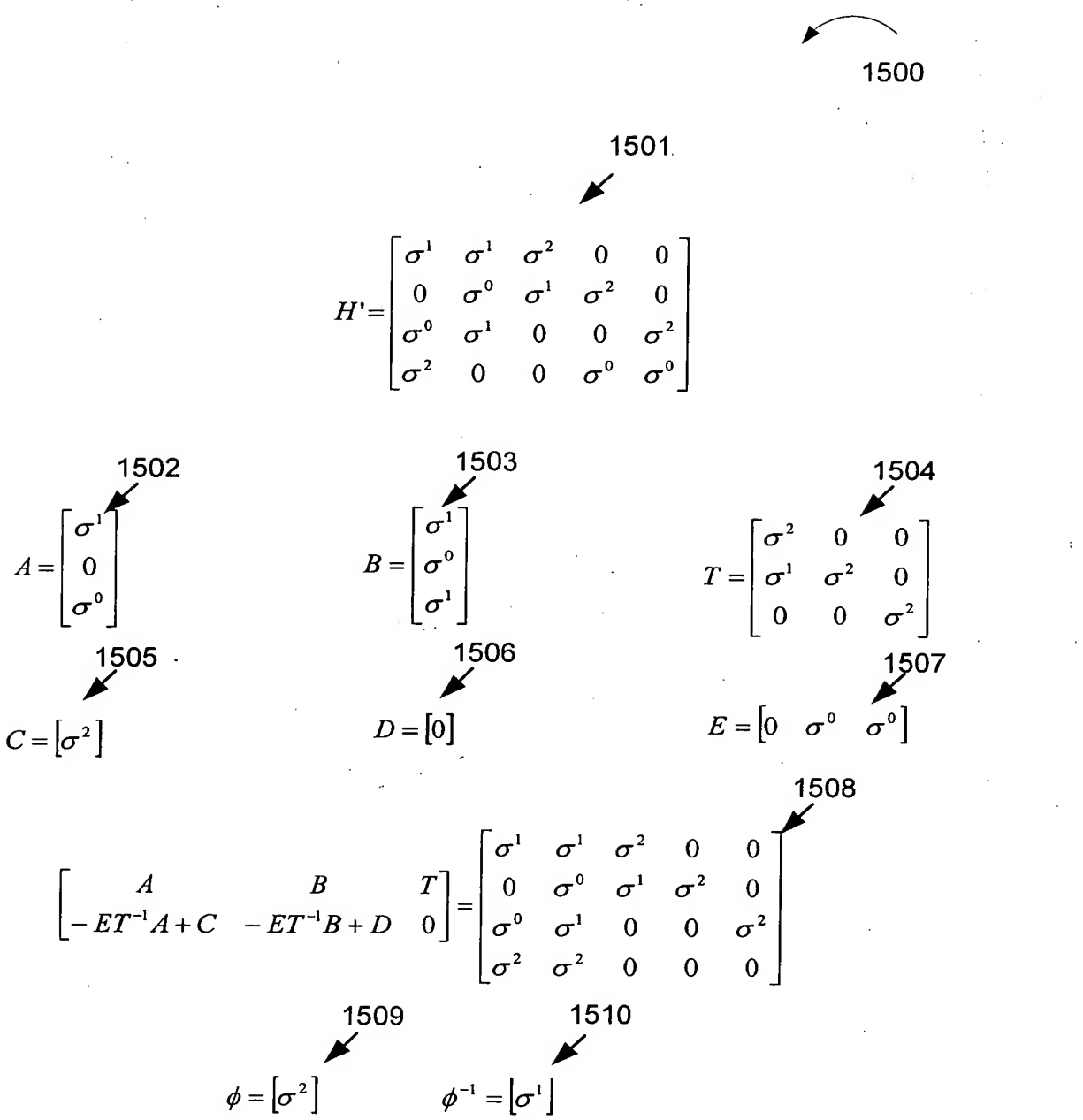

1500
1501
$H' = \begin{bmatrix} \sigma^1 & \sigma^1 & \sigma^2 & 0 & 0 \\ 0 & \sigma^0 & \sigma^1 & \sigma^2 & 0 \\ \sigma^0 & \sigma^1 & 0 & 0 & \sigma^2 \\ \sigma^2 & 0 & 0 & \sigma^0 & \sigma^0 \end{bmatrix}$
1502
$A = \begin{bmatrix} \sigma^1 \\ 0 \\ \sigma^0 \end{bmatrix}$
1503
$B = \begin{bmatrix} \sigma^1 \\ \sigma^0 \\ \sigma^1 \end{bmatrix}$
1504
$T = \begin{bmatrix} \sigma^2 & 0 & 0 \\ \sigma^1 & \sigma^2 & 0 \\ 0 & 0 & \sigma^2 \end{bmatrix}$
1505
$C = [\sigma^2]$
1506
$D = [0]$
1507
$E = [0 \quad \sigma^0 \quad \sigma^0]$
1508
$\begin{bmatrix} A & B & T \\ -ET^{-1}A + C & -ET^{-1}B + D & 0 \end{bmatrix} = \begin{bmatrix} \sigma^1 & \sigma^1 & \sigma^2 & 0 & 0 \\ 0 & \sigma^0 & \sigma^1 & \sigma^2 & 0 \\ \sigma^0 & \sigma^1 & 0 & 0 & \sigma^2 \\ \sigma^2 & \sigma^2 & 0 & 0 & 0 \end{bmatrix}$
1509
$\phi = [\sigma^2]$
1510
$\phi^{-1} = [\sigma^1]$

Figure 13

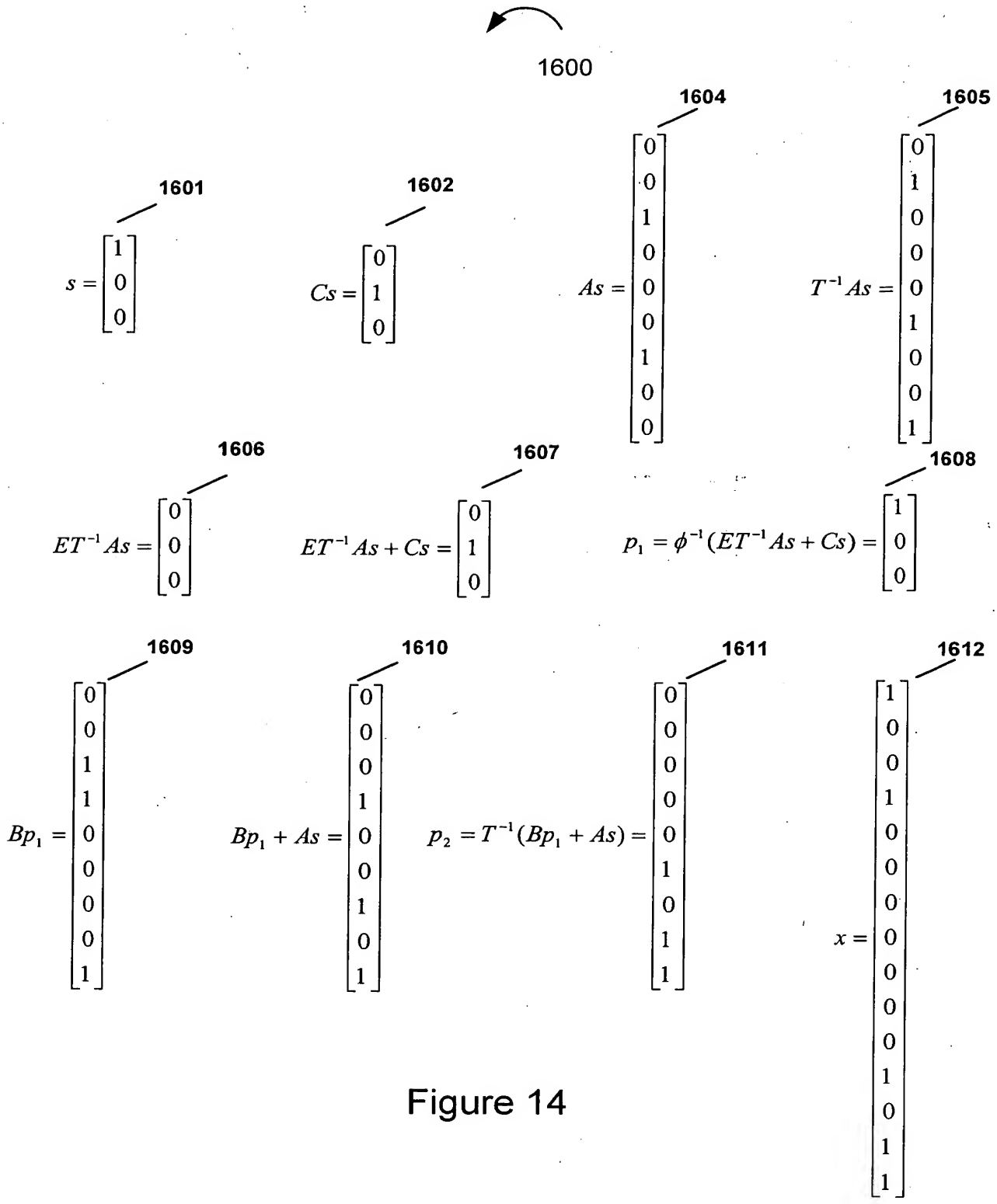

1600
1601
$s = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$
1602
$Cs = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$
1604
$As = \begin{bmatrix} 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \end{bmatrix}$
1605
$T^{-1}As = \begin{bmatrix} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \end{bmatrix}$
1606
$ET^{-1}As = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$
1607
$ET^{-1}As + Cs = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$
1608
$p_1 = \phi^{-1}(ET^{-1}As + Cs) = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$
1609
$Bp_1 = \begin{bmatrix} 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \end{bmatrix}$
1610
$Bp_1 + As = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \end{bmatrix}$
1611
$p_2 = T^{-1}(Bp_1 + As) = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \end{bmatrix}$
1612
$x = \begin{bmatrix} 1 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 1 \\ 1 \end{bmatrix}$

Figure 14

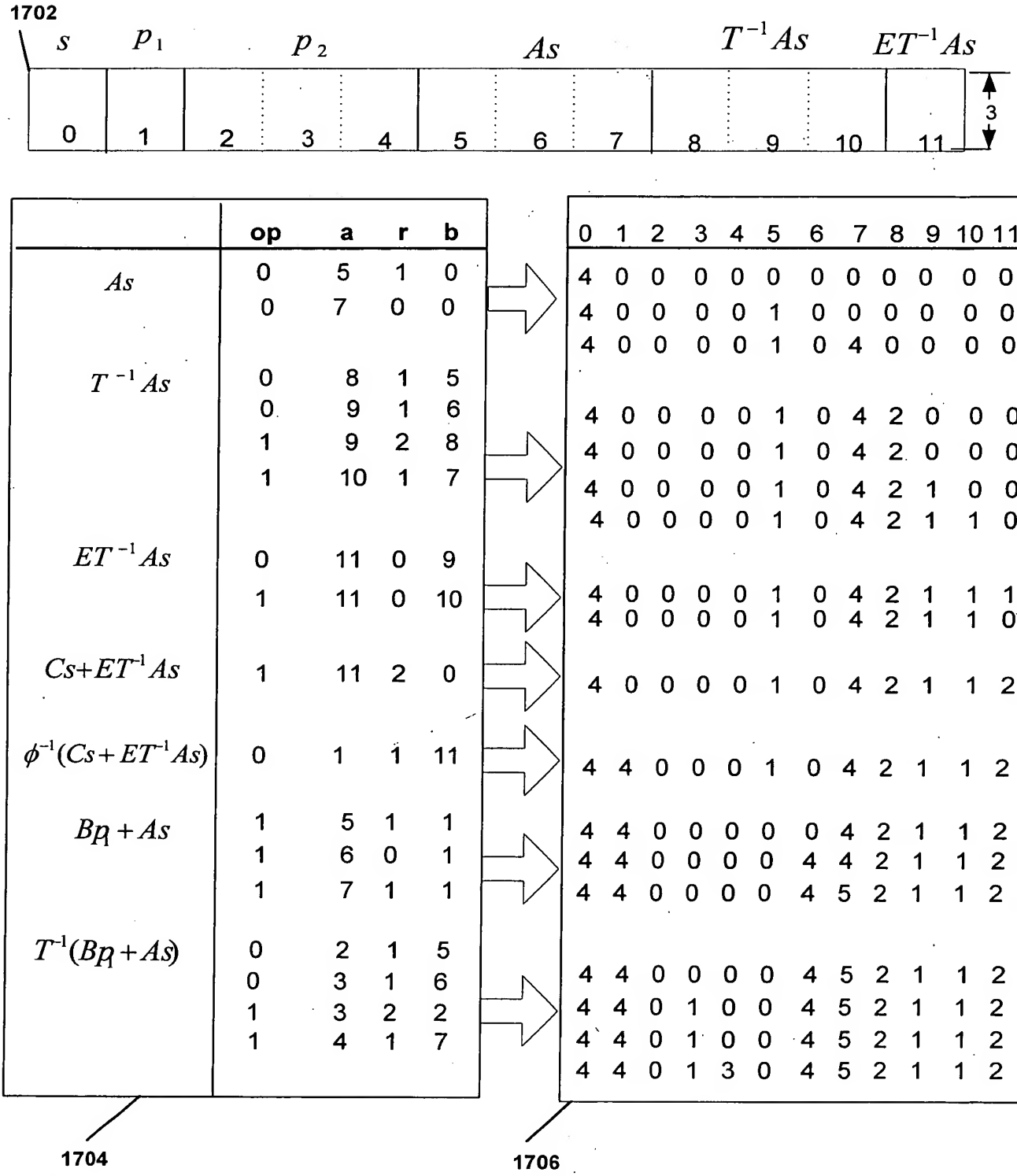

1702
s
p_1
p_2
As
$T^{-1}As$
$ET^{-1}As$
0 1 2 3 4 5 6 7 8 9 10 11
3
op a r b
As
0 5 1 0
0 7 0 0
$T^{-1}As$
0 8 1 5
0 9 1 6
1 9 2 8
1 10 1 7
$ET^{-1}As$
0 11 0 9
1 11 0 10
$Cs+ET^{-1}As$
1 11 2 0
$\phi^{-1}(Cs+ET^{-1}As)$
0 1 1 11
$Bp+As$
1 5 1 1
1 6 0 1
1 7 1 1
$T^{-1}(Bp+As)$
0 2 1 5
0 3 1 6
1 3 2 2
1 4 1 7
0 1 2 3 4 5 6 7 8 9 10 11
4 0 0 0 0 0 0 0 0 0 0 0
4 0 0 0 0 1 0 0 0 0 0 0
4 0 0 0 0 1 0 4 0 0 0 0
4 0 0 0 0 1 0 4 2 0 0 0
4 0 0 0 0 1 0 4 2 0 0 0
4 0 0 0 0 1 0 4 2 1 0 0
4 0 0 0 0 1 0 4 2 1 1 0
4 0 0 0 0 1 0 4 2 1 1 1
4 0 0 0 0 1 0 4 2 1 1 0
4 0 0 0 0 1 0 4 2 1 1 2
4 4 0 0 0 1 0 4 2 1 1 2
4 4 0 0 0 0 0 4 2 1 1 2
4 4 0 0 0 0 4 4 2 1 1 2
4 4 0 0 0 0 4 5 2 1 1 2
4 4 0 0 0 0 4 5 2 1 1 2
4 4 0 1 0 0 4 5 2 1 1 2
4 4 0 1 0 0 4 5 2 1 1 2
4 4 0 1 3 0 4 5 2 1 1 2
1704
1706

Figure 15

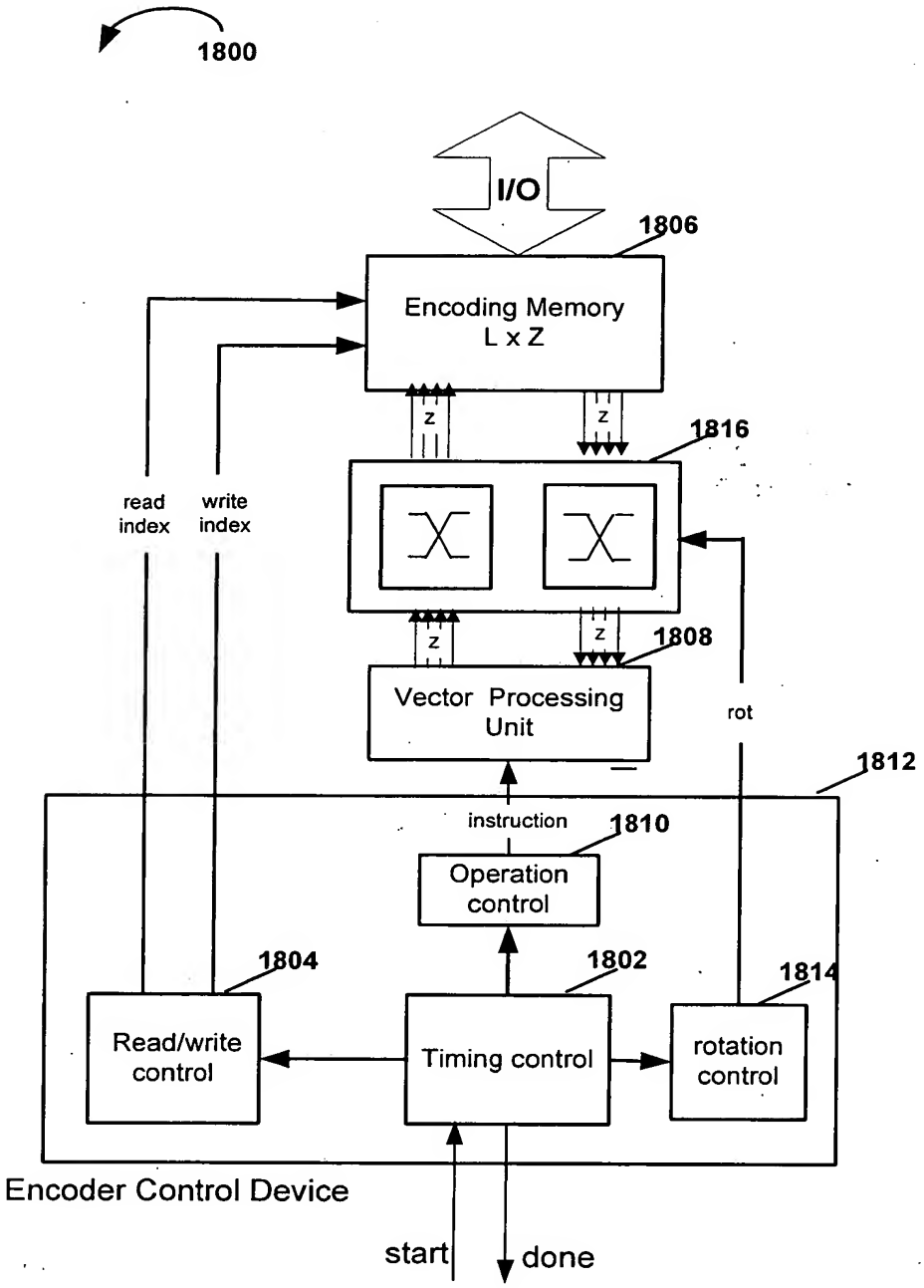

1800
I/O
1806
Encoding Memory
L x Z
z
z
1816
read
index
write
index
z
z
1808
Vector Processing
Unit
rot
1812
instruction
1810
Operation
control
1804
1802
1814
Read/write
control
Timing control
rotation
control
Encoder Control Device
start
done

Figure 16